sweet brings us a telling account of what this transformation in medicine entailed.

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THE KIDNEY: FROM NORMAL DEVELOPMENT TO CONGENITAL DISEASE

Edited by Peter D. Vize, Adrian S. Woolf, and Jonathan B.L. Bard. 519 pp., illustrated. San Diego, Calif., Academic Press, 2003. $159.95. ISBN 0-12-722441-6.

SINCE ITS PUBLICATION IN 1987, LAURI SAXén's superb monograph *Organogenesis of the Kidney* (Cambridge, United Kingdom: Cambridge University Press) has been the benchmark by which other books in the field have been judged. The past 15 years have witnessed an explosion in our knowledge of how the kidney develops, fueled to no small extent, in particular recently, by advances in comparative genomics and in numerous techniques for genetic manipulation of lower organisms. The molecular and cellular events that characterize kidney development are beginning to be unraveled; functional as well as developmental studies of the kidney in model organisms have been begun, and the molecular basis of many congenital urogenital disorders is being deciphered. These topics and others are nicely covered and well integrated in this new monograph.

The vertebrate kidney is a unique organ from a developmental perspective: two embryonic kidneys (the pronephros and mesonephros) precede the formation of the adult (metanephric) kidney in reptiles and humans, whereas the mesonephros is the adult kidney in fish and amphibians. Can a study of these early structures (especially in model organisms) shed light on the organogenesis of the adult kidney? The answer turns out to be an overwhelming yes, as shown by the finding that similar sets of genes have regulatory roles. This thread runs through the book.

The book is logically divided into three sections. The first section, which is on embryonic kidneys and model organisms, begins with a description of tubule development in an invertebrate (*Drosophila melanogaster*), which is followed by three chapters on the pronephric tubules, the nephric duct, and the pronephric glomus and vasculature. Mesonephric development is discussed in the next two chapters. Chapters on the molecular basis of pronephric development and on embryologic, genetic, and molecular techniques for studying embryonic kidney development wrap up this section.

Section II is focused on the metanephric kidney. The presentations in this section parallel those in section I, starting with anatomical descriptions of the development of components that lead to the formation of the adult kidney — the development of the ureteric bud and collecting system, the condensation of the metanephric mesenchyma, the formation of the nephron and of epithelial polarity, and the development of the glomeruli and vessels. The section concludes with chapters on developmental renal physiology and experimental methods for studying urogenital development and a review of the molecular program that underlies kidney development.

Section III, on congenital diseases, starts with an overview of urogenital malformations and then proceeds to chapters on specific genes (*WT1*, *PAX2*) and specific diseases (e.g., cystic disorders, renal cancer, tubulopathies, and proteinuric states). A chapter on gene- and cell-based therapies for congenital diseases concludes the book.

The book is well organized, lucidly written, and superbly illustrated. The writing style conveys a healthy excitement. The primary audience for this book will be serious students of kidney development, who will enjoy this comprehensive compendium and will profitably mull over the unanswered questions nicely posed at the end of many of the chapters. Developmental biologists in general will enjoy the book as well, because it does a fine job of emphasizing that the kidney is a wonderful system in which to study many critical issues in cellular and developmental biology (e.g., mechanisms of apoptosis, commitment, cell movement, mesenchymal-to-epithelial conversion, development of epithelial-cell polarity, and so on). Clinicians who desire an update on the genetic basis of hereditary and congenital renal disorders will also find the book useful, though the section on this subject may soon become outdated, given the current pace of discovery of genes with effects that lead to disease.

In biology, structure often dictates function. Ultimately, how the human kidney converts "with infinite artfulness, the red wine of Shiraz into urine" (as Isak Dinesen wrote in *Seven Gothic Tales*) is better comprehended if we understand the structural complexity of the kidney and place this organ in an evolutionary context. For this purpose, *The Kidney* is a welcome addition to the literature and a worthy successor to Saxén's classic monograph.

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